

U.S. Patent Application Serial No. 10/540,027

Amendment filed July 29, 2009

Reply to OA dated May 1, 2009

AMENDMENTS TO THE CLAIMS:

Please cancel claims 30-35 without prejudice or disclaimer, and amend claims 1-13 and 16-29, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A method of producing a polyurethane foam sheet, comprising the steps of applying a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number average molecular weight within a range of [[from]] 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), onto a substrate in a sheet-like manner, and water foaming said liquid mixture by bringing said sheet-like liquid mixture into contact with water vapor by spray misting, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range [[from]] of 1.5 to 20.0,

the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and

the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 2 (Currently amended): A method of producing a polyurethane foam sheet, comprising the steps of introducing a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number average molecular weight within a range [[from]] of 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), into a space between a first releasable substrate and a second releasable substrate to form a sheet-like product in a continuous manner, and water foaming said sheet-like product sandwiched between said first releasable substrate and said second releasable substrate by bringing either one surface or both surfaces of said releasable substrates into contact with water vapor by spray misting, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range [[from]] of 1.5 to 20.0,

the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 3 (Currently amended): A method of producing a polyurethane foam sheet, comprising the steps of introducing a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number of average molecular weight within a range

[[from]] of 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), into a space between a first releasable substrate and a second releasable substrate to form a sheet-like product in a continuous manner, removing one of said first releasable substrate and said second releasable substrate, and water foaming said sheet-like product by bringing said sheet-like product into direct contact with water vapor by spray misting, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range [[from]] of 1.5 to 20.0,

the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 4 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 1, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

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Claim 5 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 1, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

Claim 6 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 1, wherein an isocyanate group content within said hot melt urethane prepolymer (A) is within a range [[from]] of 0.5 to 10.0% by weight.

Claim 7 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 1, wherein said hot melt urethane prepolymer (A) has a melt viscosity, measured at 125°C using a cone-plate viscometer, within a range [[from]] of 100 to 100,000 mPa.s.

Claim 8 (Currently amended): A method of producing a laminated sheet, comprising the steps of applying a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number average molecular weight within a range [[from]] of 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), onto a substrate in a sheet-like manner, water foaming said liquid mixture by bringing said sheet-like liquid mixture into contact with water vapor by spray misting to form a polyurethane foam sheet, and bonding a third substrate onto said polyurethane foam sheet, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range ~~[[from]]~~ of 1.5 to 20.0,

the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 9 (Currently amended): A method of producing a laminated sheet, comprising the steps of applying a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number average molecular weight within a range ~~[[from]]~~ of 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), onto a substrate in a sheet-like manner, bonding a third substrate onto said sheet-like liquid mixture to form a laminate, and water foaming said liquid mixture by bringing said laminate into contact with water vapor by spray misting, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range ~~[[from]]~~ of 1.5 to 20.0,

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the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 10 (Currently amended): A method of producing a laminated sheet, comprising the steps of applying a liquid mixture, obtained by mixing together a heated and melted hot melt urethane prepolymer (A), with a number average molecular weight within a range [[from]] of 1,000 to 10,000 and containing isocyanate groups at molecular terminals, and a diol (B), into a space between a first resealable substrate and a second releasable substrate to form a sheet-like product in a continuous manner, removing one of said first releasable substrate and said second releasable substrate, water foaming said sheet-like product by bringing an exposed surface of said sheet-like product, and/or a remaining first or second releasable substrate, into contact with water vapor by spray misting to form a polyurethane foam sheet, and bonding a third substrate to said exposed surface of said polyurethane foam sheet from which said first or second releasable substrate has been removed, wherein

a ratio of a weight equivalence of active hydrogen atom-containing groups within said diol (B), relative to a weight equivalence of isocyanate groups within said hot melt urethane prepolymer (A) [isocyanate group equivalence / active hydrogen atom-containing group equivalence], is within a range [[from]] of 1.5 to 20.0,

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the atmospheric temperature at the surface of the sheet-like liquid mixture is set to a temperature within a range of 40 to 120°C, the atmospheric humidity is set to at least 60%, and the humidification time period is set to a value within a range of 0.5 seconds to 10 minutes, and the foaming degree of the polyurethane foam sheet is within a range of 1.5 to 3.0.

Claim 11 (Currently amended): [[A]] The method of producing a laminated sheet according to claim 8, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

Claim 12 (Currently amended): [[A]] The method of producing a laminated sheet according to claim 8, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

Claim 13 (Currently amended): [[A]] The method of producing a laminated sheet according to claim 8, wherein an isocyanate group content within said hot melt urethane prepolymer (A) is within a range of 0.5 to 10% by weight.

Claims 14-15 (canceled).

Claim 16 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 9, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

Claim 17 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 9, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

Claim 18 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 9, wherein groups an isocyanate group content within said hot melt urethane prepolymer (A) is within a range ~~[[from]]~~ of 0.5 to 10% by weight.

Claim 19 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 10, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

Claim 20 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 10, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

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Claim 21 (Currently amended): ~~[[A]]~~ The method of producing a laminated sheet according to claim 10, wherein groups an isocyanate group content within said hot melt urethane prepolymer (A) is within a range ~~[[from]]~~ of 0.5 to 10% by weight.

Claim 22 (Currently amended): ~~[[A]]~~ The method of producing a polyurethane foam sheet according to claim 2, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

Claim 23 (Currently amended): ~~[[A]]~~ The method of producing a polyurethane foam sheet according to claim 2, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

Claim 24 (Currently amended): ~~[[A]]~~ The method of producing a polyurethane foam sheet according to claim 2, wherein an isocyanate group content within said hot melt urethane prepolymer (A) is within a range ~~[[from]]~~ The 0.5 to 10.0% by weight.

Claim 25 (Currently amended): ~~[[A]]~~ The method of producing a polyurethane foam sheet according to claim 2, wherein said hot melt urethane prepolymer (A) has a melt viscosity, measured at 125°C using a cone-plate viscometer, within a range ~~[[from]]~~ of 100 to 100,000 mPa·s.

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Claim 26 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 3, wherein said liquid mixture is produced by mixing together said heated and melted hot melt urethane prepolymer (A), said diol (B), and a urethanization catalyst (C).

Claim 27 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 3, wherein said hot melt urethane prepolymer (A) is a hot melt urethane prepolymer (a-2) that also contains hydrolysable alkoxysilyl groups.

Claim 28 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 3, wherein an isocyanate group content within said hot melt urethane prepolymer (A) is within a range [[from]] of 0.5 to 10.0% by weight.

Claim 29 (Currently amended): [[A]] The method of producing a polyurethane foam sheet according to claim 3, wherein said hot melt urethane prepolymer (A) has a melt viscosity, measured at 125°C using a cone-plate viscometer, within a range [[from]] of 100 to 100,000 mPa.s.

Claims 30-35 (Canceled).

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Claim 36 (Previously presented): The method of producing a laminated sheet according to claim 8, wherein the laminated sheet is used as a synthetic leather.

Claim 37 (Previously presented): The method of producing a laminated sheet according to claim 9, wherein the laminated sheet is used as a synthetic leather.

Claim 38 (Previously presented): The method of producing a laminated sheet according to claim 10, wherein the laminated sheet is used as a synthetic leather.